REMARKS:

Claims 5-10 are cancelled without prejudice. Claim 1 is amended; a marked up version of the amended claim is attached hereto. Claims 1-4 are pending in the Application. Reexamination and reconsideration of the application, as amended, is respectfully requested.

Claims 1-5, directed to a non-elected invention, are cancelled without prejudice.

Claims 1-4 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Dunmead et al. (U.S. Patent No. 6,007,598). Claims 1-4 further stand rejected under 35 U.S.C. § 102(b) as being anticipated by Dubensky et al. (U.S. Patent 5,580,666) or Yoshimura et al. (U.S. Patent No. 5,447,549) or Fujimori et al. (U.S. Patent No. 4,279,651) or Toshiba Tungalloy KK (JP 05339659 or EP 759 480). Claim 1 is amended. Applicant respectfully traverses these rejections as to the amended claims.

The present invention relates to a cutting member, such as a cutting tool, that is made of a tungsten carbide (WC) cemented carbide which has high wear resistance and high plastic deformation resistance and is particularly well suited for cutting materials which are particularly difficult to machine, such as stainless steel. (Applicant's Specification, at p. 1, lines 4-9). The cutting tools of the present invention may conveniently be described in terms of a hard phase and a bond phase. (Specification, at p. 5, lines 1-2.) The hard phase contains WC and two or more solid solutions of WC and carbides, nitrides or carbonitrides of metals of metal s of the groups 4a, 5a, and 6a in the Periodic Table. (Specification, at p. 5, lines 2-6.) At least one of the two or more solid solutions is a solid solution having a high Nb or Zr content. (Specification, at p. 5, lines 21-23). Applicants have discovered that when at least one of the two or more solid solutions has high Nb or Zr content, the resulting cutting member has excellent mechanical strength, excellent wear resistance and plastic deformation resistance. (Specification, p. 3, lines 12-20). The bond phase includes, as a principal component, a metal of the iron group such as Co

and is preferably contained in the cemented carbide in an amount of 5 to 15% by weight. (Specification, at p. 5, lines 7-10.)

As amended, claim 1 of the present invention is as follows:

> 1. A cutting member comprising:
>
> WC having precipitated therein two or more solid solutions of WC and compounds selected from the group consisting of carbides, nitrides and carbonitrides of metals of group 4a, 5a, and 6a in the Periodic Table; and
>
> at least one metal of the iron group,
>
> wherein at least one of the two or more solid solutions is a solid solution having high Nb or Zr content.

Applicant respectfully submits that the presently claimed invention patentably distinguishes over the cited prior art because none of the cited references teaches or suggests a cutting member comprised of "WC having precipitated therein two or more solid solutions of WC and compounds selected from the group consisting of carbides, nitrides and carbonitrides of metals of group 4a, 5a, and 6a in the Periodic Table . . . wherein at least one of the two or more solid solutions is a solid solution having high Nb or Zr content" as is required by amended claim 1.

Dunmead et al. is directed to a transition metal carbide-Group VIII metal powder comprising discrete particles of a transition metal carbide and Group VIII metal. (Dunmead et al., Abstract.) In the transition metal carbide-Group VIII metal compositions of Dunmead et al., substantially all of the particles have a size of at most 0.4 micrometer. (Dunmead et al., Abstract.) The transition metal carbide is selected from carbides of the group consisting of tungsten, titanium, tantalum, molybdenum, zirconium, hafnium, vanadium, niobium, chromium, mixtures and solid solutions thereof, and the Group VIII metal is selected from the group consisting of iron, cobalt, nickel, mixtures and solid solutions thereof. The Dunmead et al. powders are produced by heating an admixture comprising a finishing source of carbon (e.g., acetylene black), a source of a group VIII metal (e.g., Co_3O_4), and a particulate precursor to a temperature of about 1173 K to about 1773

K for a time sufficient to form a transition metal carbide-Group VIII metal powder, wherein at least about 25% by weight of the carbide precursor is carburized in forming the transition metal carbide of the transition metal carbide-Group VIII metal powder. (Dunmead et al., Abstract.)

While Dunmead et al. may teach that the transition metal carbide is selected from carbides of the group consisting of tungsten, titanium, tantalum, molybdenum, zirconium, hafnium, vanadium, niobium, chromium, mixtures and solid solutions thereof, nothing in Dunmead et al. suggests the use of WC with two solid solutions precipitated therein as is required by claim 1. Further, while Dunmead et al. may teach generally about the use of a solid solution of WC and Nb as part of the cutting tool, nothing in Dunmead et al. either teaches or suggests precipitating such a solid solution in a matrix of WC itself as in the present invention. Further, Nothing in Dunmead et al. either teaches or suggests that there be <u>two</u> solid solutions precipitated in the WC, and that at least one of the two or more solid solutions is a solid solution having high Nb or Zr content as is required by claim 1. Since Dunmead et al. fails to either teach or suggest each element of the claimed invention, Dunmead et al. cannot render the claimed invention obvious.

Dubensky et al. is directed to multi-phase cemented ceramic material that is useful for machining and forming metals, including ferrous metals. (Dubensky et al., Abstract.) The compositions of Dubensky et al. are a multi-phase cemented ceramic material which includes at least two types of hard phase constituents, including a first type of hard phase constituent selected from the group consisting of the carbides, nitrides, carbonitrides, carboxynitrides, and mixtures thereof of Group IVB (Ti, Zr, Hf), Group VB (V, Nb, Ta), Group VIB (Cr, Mo and W) transition metals, and a second type of ultrafine solid solution hard phase constituent. (Col. 3, lines 55-62.) The solid solution hard phase constituent is selected from the group consisting of the carbides, nitrides, carbonitrides, carboxynitrides, and combinations thereof, of at least two metallic elements from Group IVB (Ti, Zr, Hf), Group VB (V, Nb, Ta), and Group VIB (Cr, Mo and W) transition metals; and a metallic binder

phase selected from the group consisting of Group VIII elements (Co, Ni, Fe), Group IVB (Cr, Mo, W) and mixtures thereof. Col. 3, line 65 – col. 4, line 5.)

Nothing in Dunbensky et al. teaches or suggests the use of WC with two solid solutions precipitated therein as is required by claim 1. Further, Nothing in Dubensky et al. either teaches or suggests that of the two solid solutions precipitated in the WC, at least one of the two or more solid solutions is a solid solution having high Nb or Zr content as is required by claim 1. Since Dubensky et al. fails to either teach or suggest each element of the claimed invention, Dubensky et al. cannot render the claimed invention obvious.

Yoshimura is directed to a hard alloy suitable for use in cutting tools, which exhibits excellent wear and fracture resistance. In Yoshimura, a typical cemented carbide for cutting tools comprises a hard dispersed phase which consists essentially of tungsten carbide and, optionally, at least one compound selected from the group consisting of carbide, nitride and carbonitride which contains at least one element of titanium, tantalum, molybdenum, niobium, vanadium or chromium; and a binder metal phase which consists essentially of at least one metal selected from the group consisting of cobalt, nickel, iron and aluminum. (Col. 3, lines 38-47.)

Nothing in Yoshimura teaches or suggests the use of WC with two solid solutions precipitated therein as is required by claim 1. Further, Nothing in Yoshimura either teaches or suggests that of the two solid solutions precipitated in the WC, at least one of the two or more solid solutions is a solid solution having high Nb or Zr content as is required by claim 1. Since Yoshimura fails to either teach or suggest each element of the claimed invention, Yoshimura cannot render the claimed invention obvious.

Fujimori et al. is directed to a sintered hard metal having high wear resistance and heat resistance that is useful for cutting and wear resistant tools. (Fujimori et al., Abstract.) The invention relates to a sintered hard metal belonging to the latter category. Generally, the mixed carbide phase has B-1 type crystals, one of the facecentered cubic structure, and is represented by the following general formula: $(M_A,M'_B,M''_C)(C_u,N_v,O_w)_z$ wherein M is a Group IVa metal, M' is a Group

Va metal, M" is Group VIa metals, the variables A, B, C, u. v, w represent the atomic ratios respectively and z represents the ratio of nonmetallic elements to metallic elements. In Fujiomori et al., the relation between the various rations as follows:

$$A+B+C=1,$$

$$u+v+w=1$$

(Fujimori et al., Col. 2, lines 5-24.)

Nothing in Fujimori et al. teaches or suggests the use of WC with two solid solutions precipitated therein as is required by claim 1. Further, Nothing in Fujimori et al. either teaches or suggests that of the two solid solutions precipitated in the WC, at least one of the two or more solid solutions is a solid solution having high Nb or Zr content as is required by claim 1. Since Fujimori et al. fails to either teach or suggest each element of the claimed invention, Fujimori et al. cannot render the claimed invention obvious.

Toshiba Tungalloy KK ("Toshiba") is directed to a plate-crystalline tungsten carbide-containing hard alloy which comprise 4 to 40% by volume of a binder phase containing at least one of iron group metals selected from Co, Ni and Fe as a main component, and the balance of a hard phase comprising tungsten carbide alone or tungsten carbide and 50% or less of a compound with a cubic structure selected from at least one of carbide and nitride of the 4a (Ti, Zr and Hf), 5a (V, Nb and Ta) and 6a (C, Mo, and W) group element of the Periodic Table and mutual solid solutions thereof, and inevitable impurities. (Toshiba, Abstract.)

Nothing in Toshiba teaches or suggests the use of WC with two solid solutions precipitated therein as is required by claim 1. Further, Nothing in Toshiba et al. either teaches or suggests that of the two solid solutions precipitated in the WC, at least one of the two or more solid solutions is a solid solution having high Nb or Zr content as is required by claim 1. Since Toshiba fails to either teach or suggest each element of the claimed invention, Toshiba cannot render the claimed invention obvious.

In light of the foregoing, withdrawal of the rejection and allowance of amended claim 1 is respectfully requested.

Claims 2-4 depend from claim 1 and are patentable for at least the same reasons as claim 1. As such, withdrawal of the rejection and allowance of claims 2-4 is respectfully requested.

The art made of record but not relied on by the Examiner has been considered. However, it is submitted that this art neither describes nor suggests the presently claimed invention.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

Date: February 6, 2003

By: Lawrence J. McClure

Lawrence J. McClure
Registration No. 44,228
Attorney for Applicant(s)

500 South Grand Avenue, Suite 1900
Los Angeles, California 90071
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Version with markings to show changes made:

1. (Amended) A cutting member comprising:

WC[,] having precipitated therein two or more solid solutions of WC and compounds selected from the group consisting of carbides, nitrides and carbonitrides of metals of group 4a, 5a, and 6a in the Periodic Table[,]; and

at least one metal of the iron group,

wherein at least one of the two or more solid solutions is a solid solution having high Nb or Zr content.

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IMPORTANT NOTICE
TELECOPY/FACSIMILE COVER LETTER

TO: U.S. Patent and Trademark Office
Examiner: Archiene A. Turner
Art Unit: 1775

DATE: February 6, 2003

FROM: Lawrence J. McClure

TIME:

TOTAL NO. OF PAGES, INCLUDING COVER: 10

MESSAGE:

RE: U.S. Patent Application Serial No.: 09/734,275; Our Ref. 81863.0007

I hereby certify that the following documents:

- Amendment
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February 6, 2003
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Diane Zynn

TELECOPY/FAX NUMBER: 703-872-9310

CLIENT NUMBER: 81863.0007

ATTORNEY BILLING NUMBER: 1966

CONFIRMATION NUMBER: (703) 308-6213 (please return fax to Diane Zynn)

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Feb-06-03 12:58pm From-Hogan & Hartson L.L.P. Los Angeles, CA 1 213 337 6701 T-038 P.001/010 F-408

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CLIENT NUMBER: 81863.0007
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CONFIRMATION NUMBER: (703) 308-6213 (please return fax to Diane Zynn)

FORM PTO-1083 81863.0007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Daisuke SHIBATA

Serial No: 09/734,275

Filed: December 11, 2000

For: CUTTING MEMBER

Art Unit: 1775

Examiner: Archiene A. Turner

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Diane Zynn
Name

Diane Zynn 02/06/03
Signature Date

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Transmitted herewith is an amendment in the above-identified application.

☐ Small entity status has been claimed. See 37 CFR § 1.27.

☐ A certified copy of ___ Patent Application No. ___ filed ___ from which priority is claimed under 35 U.S.C. § 119 is enclosed.

☐ A Notice Of Change Of Attorney's Address and Associate Power Of Attorney is enclosed.

☒ No additional fee is required.

The fee has been calculated as shown below:

	(Col. 1) CLAIMS REMAINING AFTER AMENDMENT		(Col. 2) HIGHEST NUMBER PREVIOUSLY PAID FOR		(Col. 3) PRESENT EXTRA*	LG/SM $ ENTITY FEE		ADD'L FEE DUE
TOTAL CLAIMS FEE	4	-	20	**	0	LG=$18 SM=$9	$0	$ 0
INDEPENDENT CLAIMS FEE	1	-	3	***	0	LG=$84 SM=$42	$0	$ 0
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIMS						LARGE ENTITY FEE = $280 SMALL ENTITY FEE = $140		$ 0
Independent Claims: 1							**TOTAL**	$ 0

* If the entry in Col. 1 is less than the entry in Col. 2, write "0" in Col. 3.

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☐ A check in the amount of $ 0 to cover the additional claims fee is enclosed. **A copy of this she t is enclosed.**

☐ A check in the amount of $ 0 to cover the extension fee is enclosed. **A copy of this sheet is enclosed.**

☒ The Commissioner is hereby authorized to charge any deficiencies of fees associated with this communication or credit any overpayment to Deposit Account No. 50-1314. **A copy of this sheet is enclosed.**

☒ Any filing fees under 37 C.F.R. § 1.16 for the presentation of extra claims

☒ Any patent application processing fees under 37 C.F.R. § 1.17

Respectfully submitted,
HOGAN & HARTSON L.L.P.

By: Lawrence J. McClure
Lawrence J. McClure
Registration No. 44,228
Attorney for Applicant(s)

Date: February 6, 2003

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